


# EXHIBIT B


 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 1 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

## Revision History:

<b>Revision</b>	<b>Comments</b>
1.0	Initial release for routing


**BEST AVAILABLE COPY**

# EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 2 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>					

<b>1</b>	<b>INTRODUCTION .....</b>	<b>3</b>
1.1	Purpose.....	3
1.2	Scope .....	3
1.3	Document Overview .....	3
<b>2</b>	<b>REFERENCES AND DEFINITIONS .....</b>	<b>4</b>
2.1	Internal Medtronic References.....	4
	Note: Document revisions referenced in DVT Plan. ....	4
2.2	External References .....	4
2.3	Definitions, Acronyms, and Abbreviations .....	4
<b>3</b>	<b>TEST RESULTS SUMMARY .....</b>	<b>5</b>
3.1	Test Paths .....	6
<b>4</b>	<b>ELECTRICAL TESTS .....</b>	<b>7</b>
4.1	Power Source Tests .....	7
4.1.1	Current Drain Test .....	7
4.1.2	Supply Voltage Range Test.....	9
4.2	Input/Output Connections Tests .....	11
4.2.1	Keypad Interface Test.....	11
4.2.2	Display Interface Test .....	12
4.2.3	External Antenna Interface Test.....	14
4.2.4	Infrared Port Interface Test .....	16
4.2.5	Audio Transducer Test.....	17
4.2.6	Manufacturing/Test Interface Test.....	18
4.3	Internal Resources Tests .....	19
4.3.1	Memory Test .....	19
4.3.2	Real-Time Clock Backup Test.....	20
4.3.3	Real-Time Clock Accuracy Test .....	21
4.3.4	A/D Measurements Test .....	22
4.3.5	D/A Control Voltages Test.....	24
4.4	Transmit Telemetry (Downlink) Tests .....	25
4.4.1	Magnetic Field Intensity Test.....	25
4.4.2	Burst Characteristics Test.....	27
4.5	Receive Telemetry (Uplink) Tests .....	30
4.5.1	Detection Threshold Test.....	30
4.5.2	Detection Margin Test.....	32
4.5.3	Noise Immunity Test .....	34
4.5.4	Signal Distortion Test.....	37
4.5.5	Turnaround Time Test .....	40
4.5.6	Hold Drift Test.....	41
4.5.7	New-Battery FET Test .....	43
4.6	Telemetry Performance Tests.....	44
4.6.1	.....	44
<b>5</b>	<b>COMPLETION .....</b>	<b>49</b>

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> <b>288117-70205</b>	<b>Rev/Version</b> <b>1.0</b>	<b>Sht</b> <b>3 of 49</b>
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

### 1 INTRODUCTION

This document is the electrical Design Verification Test (DVT) Report for the 37741 Patient Programmer Platform.

#### 1.1 Purpose

The purpose of this report is to document the results of test plan .

#### 1.2 Scope


This report applies only to design verification testing of the 37741 Patient Programmer Platform.

#### 1.3 Document Overview

This document is organized as follows:

- Section 2 contains references and definitions.
- Section 3 contains a table with the list of tests, software revisions, sample sizes, and test results.
- Section 4 contains the results of the electrical design verification tests.

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 4 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

## 2 REFERENCES AND DEFINITIONS

This section identifies internal and external reference documents that augment the information provided in this document. It also defines terms, acronyms, and abbreviations used within the document.

### 2.1 Internal Medtronic References

Number	Name
120275	
215387	
288117-70040	
288117-70044	
288117-70029	
503011001	
288117-70200	

Note: Document revisions referenced in DVT Plan.

### 2.2 External References

*Reference the PEM Electrical Specification for external specification standards.*

### 2.3 Definitions, Acronyms, and Abbreviations

**ARB:** Arbitrary Waveform Generator

**ARB equipment:** One or more arbitrary waveform generators, used alone or in conjunction to generate sophisticated waveforms.

**DUT:** Device Under Test

**DVT:** Design Verification Test

**DVT Console:** The test console needed to perform the tests specified herein.

**ES:** Electrical Specification #120275


**GPB:** General Purpose Interface Bus

**PEM:** Patient Electronic Module

**PP:** Patient Programmer

**POR:** Power On Reset

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> <b>288117-70205</b>	<b>Rev/Version</b> <b>1.0</b>	<b>Sht</b> <b>5 of 49</b>
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

### 3 Test Results Summary


Table 1 summarizes the results of all electrical design verification testing. Section 4 details each test setup, criteria, and results.

- Test data is stored as 288117-70200.
- Table 1 indicates test name, sample size, DUT software revision, Test Script Software revision, test path, and results.
- Test paths are shown in section 3.1.

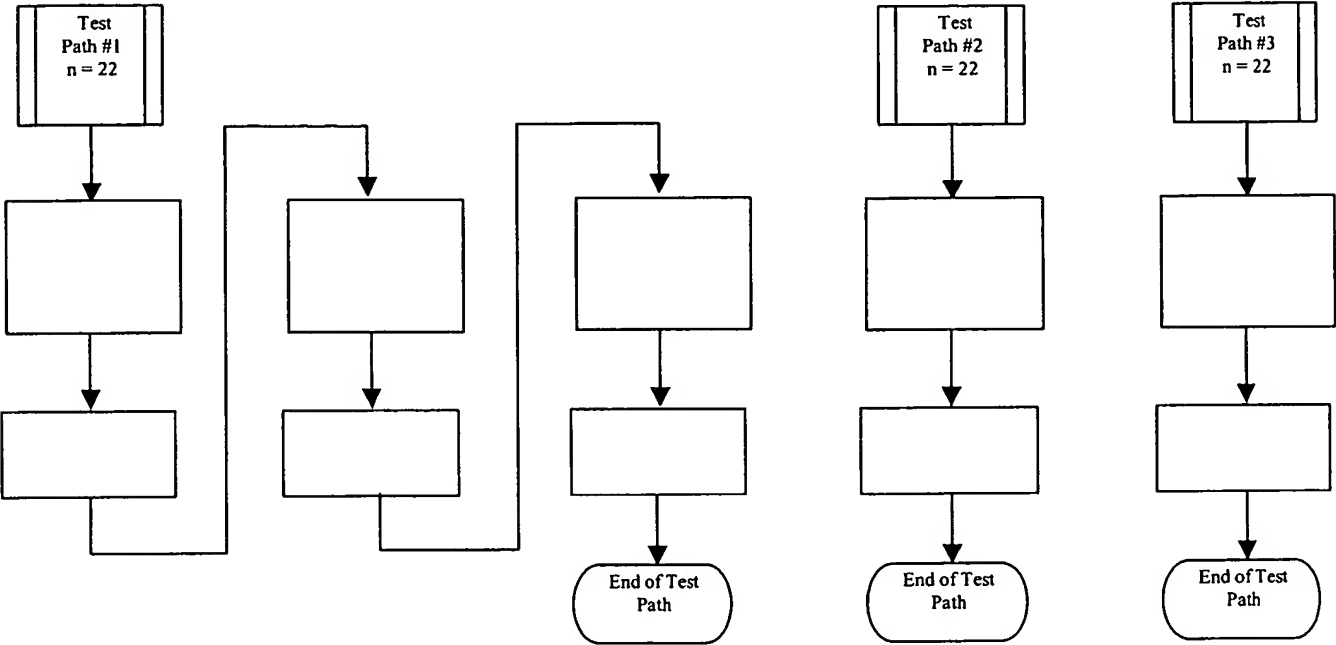
Table 1

[illegible]


EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 6 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

3.1 Test Paths



# EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 7 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>					

## 4 ELECTRICAL TESTS

This section specifies electrical tests performed on the 37741 Patient Programmer Platform.

### 4.1 Power Source Tests

#### 4.1.1 Current Drain Test

##### 4.1.1.1 Objective

To verify the current drain meets the requirements specified in the *Power Source* section of the PEM Electrical Specification.

##### 4.1.1.2 Method and Equipment

##### 4.1.1.3 Test Cases

There are \_ test cases for transmit using all combinations of test values below:

Parameter	Test Values	Units

The

There are test cases using all combinations of test values below:

Parameter	Test Values	Units


There are test cases using two combinations of test values below:

Parameter	Test Values	Units

There are total test cases.

##### 4.1.1.4 Acceptance Criteria

# EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 8 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>					

Operating Condition (Ref.)	Antenna	Duty Cycle (%)	Current Drain (mA) MAX		
			V	V	V
Row A	INT				
Row B	INT				
Row C	INT				
Row D	INT				
Row E	INT				
Row F	INT				
Row G	INT				
Row H	EXT				
Row I	INT				
Row J	INT				

Note 1:

## 4.1.1.5 Test Setup

- 1.
- 2.
- 3.
- 4.

## 4.1.1.6 Test Procedure


- 1.
- 2.

3.

4.



## EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	Document Number 288117-70205	Rev/Version 1.0	Sht 9 of 49
Title: Neuro Patient Programmer Platform Electrical DVT Report					

4.1.1.7 RESULTS **PASS**

All devices met the acceptance criteria.


Operating Condition	Current Drain (mA) MAX																
	Row	Spec	Min	Max	Mean	Std Dev	Spec	Min	Max	Mean	Std Dev	Spec	Min	Max	Mean	Std Dev	
A																	
B																	
C																	
D																	
E																	
F																	
G																	
H																	
I																	
J																	

4.1.2 **Supply Voltage Range Test**4.1.2.1 Objective

To verify the supply voltage range meets the requirements specified in the *Power Source* section of the PEM Electrical Specification.

4.1.2.2 Method and Equipment4.1.2.3 Test Cases

# EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	Document Number 288117-70205	Rev/Version 1.0	Sht 10 of 49
Title: Neuro Patient Programmer Platform Electrical DVT Report					

Parameter	Test Values	Units

The

There is test case without transmit:

Parameter	Test Values	Units

## 4.1.2.4 Acceptance Criteria

Operating Condition	Antenna	H-Bridge Drive Duty Cycle (%)	Min operating voltage (V)


## 4.1.2.5 Test Setup

- 1.
- 2.
- 3.
- 4.

## 4.1.2.6 Test Procedure

- 1.
- 2.
- 3.

# EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> <b>288117-70205</b>	<b>Rev/Version</b> <b>1.0</b>	<b>Sht</b> <b>11 of 49</b>
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

## 4.1.2.7 RESULTS **PASS**

All devices met the acceptance criteria.

Operating Condition	Antenna	Supply Voltage Range (Volts)				
		Min	Max	Avg	Std Dev	

## 4.2 Input/Output Connections Tests

### 4.2.1 Keypad Interface Test

#### 4.2.1.1 Objective

To verify the keypad interface meets the requirements specified in the *Input/Output Connections* section of the PEM Electrical Specification.

#### 4.2.1.2 Method and Equipment

#### 4.2.1.3 Test Cases

Parameter	Test Values	Units


#### 4.2.1.4 Acceptance Criteria

#### 4.2.1.5 Test Setup

- 1.
- 2.
- 3.

#### 4.2.1.6 Test Procedure

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 12 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

3.

**4.2.1.7 RESULTS PASS**

All devices met the acceptance criteria.

Tests	Keypad Interface (pass/fail)		
	Pass	Pass	Pass
	Pass	Pass	Pass

**4.2.2 Display Interface Test****4.2.2.1 Objective**


To verify the display interface meets the requirements specified in the *Input/Output Connections* section of the PEM Electrical Specification.

**4.2.2.2 Method and Equipment****4.2.2.3 Test Cases**

There are test cases using combinations of the test values below:

Parameter	Test Values	Units


# EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 13 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

## 4.2.2.4 Acceptance Criteria

Test Parameters				Requirements			

## EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> <b>288117-70205</b>	<b>Rev/Version</b> <b>1.0</b>	<b>Sht</b> <b>14 of 49</b>
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>					

### 4.2.3 External Antenna Interface Test

#### 4.2.3.1 Objective

To verify the external antenna interface meets the requirements specified in the *Input/Output Connections* section of the PEM Electrical Specification.

#### 4.2.3.2 Method and Equipment

#### 4.2.3.3 Test Cases

There are test cases using all combinations of test values below:

Parameter	Test Values	Units

#### 4.2.3.4 Acceptance Criteria


- When an external antenna is connected, there should be no downlink from the internal antenna.
- When an external antenna is connected, the uP should detect that the antenna is connected.

External Antenna					Yes/No
	Min	Max	Min	Max	

#### 4.2.3.5 Test Setup

- 1.
- 2.
- 3.
- 4.
- 5.

EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	Document Number <b>288117-70205</b>	Rev/Version 1.0	Sht 15 of 49
Title: Neuro Patient Programmer Platform Electrical DVT Report				

4.2.3.6 Test Procedure

1.

2.


3.

4.

4.2.3.7 RESULTS **PASS**

All devices met the acceptance criteria.

## EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 16 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>					

Test Configuration	Test
	A
	B

External Antenna Interface (A/m)														
Test														
	Min	Max	Mean	Std dev		Min	Max	Mean	Std dev		Min	Max	Mean	Std dev
A														
B														

### 4.2.4 Infrared Port Interface Test

#### 4.2.4.1 Objective

To verify the infrared port interface meets the requirements specified in the *Input/Output Connections* section of the PEM Electrical Specification. [PTPROG\_PEMT-0006:1]

#### 4.2.4.2 Method and Equipment

#### 4.2.4.3 Test Cases

There are test cases using all combinations of test values below:

Parameter	Test Values	Units

#### 4.2.4.4 Acceptance Criteria


All	All	None

#### 4.2.4.5 Test Setup

- 1.
- 2.



# EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 17 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>					

3.

## 4.2.4.6 Test Procedure

1.

2.

3.

4.

## 4.2.4.7 RESULTS **PASS**

All devices met the acceptance criteria.

Voltage (V)	Infrared (pass/fail)								
	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

## 4.2.5 Audio Transducer Test

### 4.2.5.1 Objective


To verify the audio transducer meets the requirements specified in the *Input/Output Connections* section of the PEM Electrical Specification.

### 4.2.5.2 Method and Equipment

### 4.2.5.3 Test Cases

There are test cases using all combinations of test values below:

# EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 18 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>					

Parameter	Test Values	Units

## 4.2.5.4 Acceptance Criteria


## 4.2.5.5 Test Setup

- 1.
- 2.
- 3.
- 4.
- 5.

## 4.2.5.6 Test Procedure

- 1.
- 2.
- 3.
- 4.

## 4.2.5.7 RESULTS **PASS**


All devices met the acceptance criteria.

Audio Transducer (dB SPL)														
Min	Max	Mean	Std dev		Min	Max	Mean	Std dev		Min	Max	Mean	Std dev	

## 4.2.6 **Manufacturing/Test Interface Test**

Manufacturing requirements defined in Test Specification, Patient Programmer, 215387.

## EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	Document Number 288117-70205	Rev/Version 1.0	Sht 19 of 49
Title: Neuro Patient Programmer Platform Electrical DVT Report					

**4.3 Internal Resources Tests****4.3.1 Memory Test****4.3.1.1 Objective**

To verify the internal memory resources meet the requirements specified in the *Internal Resources* section of the PEM Electrical Specification.

**4.3.1.2 Method and Equipment****4.3.1.3 Test Cases**

There are test cases using all combinations of test values below:

Parameter	Test Values	Units

**4.3.1.4 Acceptance Criteria**

All	Pass

**4.3.1.5 Test Setup**

- 1.
- 2.
- 3.

**4.3.1.6 Test Procedure**


- 1.
- 2.
- 3.
- 4.

**4.3.1.7 RESULTS PASS**

All devices met the acceptance criteria.

Test	Memory (pass/fail)		
	Pass	Pass	Pass
	Pass	Pass	Pass
	Pass	Pass	Pass

# EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 20 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>					

## 4.3.2 Real-Time Clock Backup Test

### 4.3.2.1 Objective

To verify the real-time clock backup meets the requirements specified in the *Internal Resources* section of the PEM Electrical Specification.

### 4.3.2.2 Method and Equipment

### 4.3.2.3 Test Cases

There is one test case below:

Parameter	Test Value	Units

### 4.3.2.4 Acceptance Criteria

Test Case	Min Time w/o power (min)

### 4.3.2.5 Test Setup

- 1.
- 2.
- 3.


### 4.3.2.6 Test Procedure

- 1.
- 2.
- 3.
- 4.
- 5.

### 4.3.2.7 RESULTS **PASS**

All devices met the acceptance criteria.

## EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 21 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>					

Test	Real-Time Backup (pass/fail)		
	Pass	Pass	Pass

### 4.3.3 Real-Time Clock Accuracy Test

#### 4.3.3.1 Objective

To verify the real-time clock accuracy meets the requirements specified in the *Internal Resources* section of the PEM Electrical Specification.

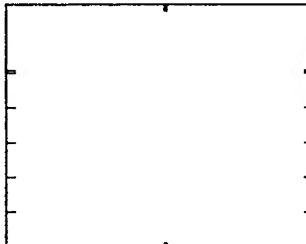
#### 4.3.3.2 Method and Equipment

#### 4.3.3.3 Test Cases

There are test cases (actually measurement points) using all combinations of test values below:

Parameter	Test Value	Units

#### 4.3.3.4 Acceptance Criteria



#### 4.3.3.5 Test Setup

- 1.
- 2.


#### 4.3.3.6 Test Procedure

- 1.
- 2.

#### 4.3.3.7 RESULTS **PASS**

All devices met the acceptance criteria.

## EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 22 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>					

Real Time Clock Accuracy (seconds)					

### 4.3.4 A/D Measurements Test

#### 4.3.4.1 Objective

To verify the A/D measurement accuracy meets the requirements specified in the *Internal Resources* section of the PEM Electrical Specification.

#### 4.3.4.2 Method and Equipment

#### 4.3.4.3 Test Cases

There are      test cases using the test values below:

Parameter	Test Values	Units


#### 4.3.4.4 Acceptance Criteria

A/D Voltage	Test Value	Max Error (%)

#### 4.3.4.5 Test Setup

- 1.
- 2.
- 3.
- 4.

EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> <b>288117-70205</b>	<b>Rev/Version</b> <b>1.0</b>	<b>Sht</b> <b>23 of 49</b>
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

5.

4.3.4.6 Test Procedure

1.

2.


3.

4.

4.3.4.7 RESULTS **PASS**

All devices met the acceptance criteria.

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 24 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

[illegible]

#### 4.3.5 D/A Control Voltages Test

#### 4.3.5.1 Objective

To verify the D/A accuracy meets the requirements specified in the *Internal Resources* section of the PEM Electrical Specification.

#### 4.3.5.2 Method and Equipment

#### 4.3.5.3 Test Cases

There are test cases using all combinations of test values below:



Sht  
25 of 49

Parameter	Test Value	Units

D/A Voltage	Measurement point	Max % Error
-------------	-------------------	-------------

- 1.
- 2.
- 3.
- 4.

- 1.
- 2.
- 3.

All devices met the acceptance criteria.


[illegible]

#### 4.4.1 Magnetic Field Intensity Test

#### 4.4.1.1 Objective

To verify downlink magnetic field intensity meets the requirements specified in the *Transmit Telemetry (Downlink)* section of the PEM Electrical Specification.

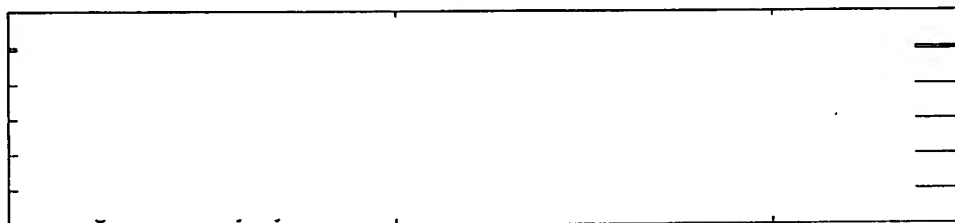
## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 26 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

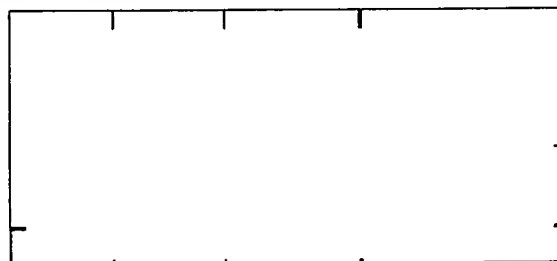
#### 4.4.1.2 Method and Equipment

#### 4.4.1.3 Test Cases

There are test cases at kHz using all combinations of test values below:



#### 4.4.1.4 Acceptance Criteria




#### 4.4.1.5 Test Setup

- 1.
- 2.
- 3.
- 4.
- 5.

#### 4.4.1.6 Test Procedure

- 1.
- 2.
- 3.
- 4.

# EXHIBIT B (cont.)

	<b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 27 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>					

5.

## 4.4.1.7 RESULTS **PASS**

All devices met the acceptance criteria.

	<b>Magnetic Field Intensity (A/m)</b>

## 4.4.2 **Burst Characteristics Test**

### 4.4.2.1 Objective

To verify downlink burst characteristics of width, rise time, fall time, frequency, and overshoot meet the requirements specified in the *Transmit Telemetry (Downlink)* section of the PEM Electrical Specification.


### 4.4.2.2 Method and Equipment

### 4.4.2.3 Test Cases

There are test cases using all combinations of test values below:

<b>Parameter</b>	<b>Test Values</b>	<b>Units</b>

EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	Document Number <b>288117-70205</b>	Rev/Version 1.0	Sht 28 of 49
Title: Neuro Patient Programmer Platform Electrical DVT Report				

4.4.2.4 Acceptance Criteria

--

4.4.2.5 Test Setup

- 1.
- 2.
- 3.
- 4.
- 5.


4.4.2.6 Test Procedure

- 1.
- 2.
- 3.
- 4.
- 5.

4.4.2.7 RESULTS **PASS**


All devices met the acceptance criteria.

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> <b>288117-70205</b>	<b>Rev/Version</b> <b>1.0</b>	<b>Sht</b> <b>29 of 49</b>
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

[illegible]

## EXHIBIT B (cont.)

 <b>Medtronic</b>	Neurological	Document Number 288117-70205	Rev/Version 1.0	Sht 30 of 49
Title: Neuro Patient Programmer Platform Electrical DVT Report				

### 4.5 Receive Telemetry (Uplink) Tests

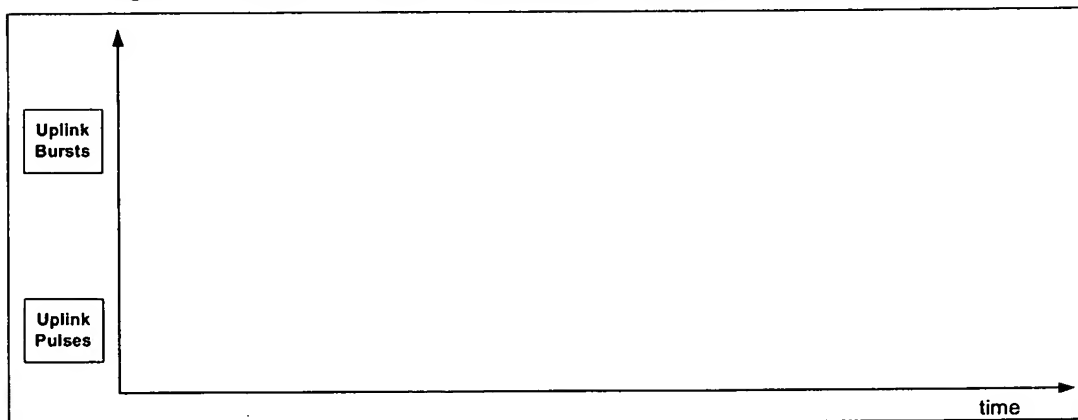
#### 4.5.1 Detection Threshold Test

##### 4.5.1.1 Objective

To verify uplink detection threshold (i.e. receiver sensitivity) meets the requirements specified in the *Receive Telemetry (Uplink)* section of the PEM Electrical Specification.

##### 4.5.1.2 Method and Equipment

**Figure 1: Example Uplink Detection Threshold Test Waveforms**




##### 4.5.1.3 Test Cases

There are     test cases using all combinations of test values below:

Parameter	Test Values	Units

The supply voltage is 2.5 V.

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> <b>288117-70205</b>	<b>Rev/Version</b> <b>1.0</b>	<b>Sht</b> <b>31 of 49</b>
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

#### 4.5.1.4 Acceptance Criteria

Antenna	Telemetry Type	Detection Onset (Uplink dB)	Detection Threshold (Uplink dB)	Maximum Input Level (Uplink dB)
		Max	Max	Max

#### 4.5.1.5 Test Setup

- 1.
- 2.
- 3.
- 4.

- 5.

#### 4.5.1.6 Test Procedure


- 1.
- 2.
- 3.
- 4.

4.5.1.7 RESULTS **PASS**

All devices met the acceptance criteria.

[illegible]

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> <b>288117-70205</b>	<b>Rev/Version</b> <b>1.0</b>	<b>Sht</b> <b>32 of 49</b>
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

Antenna	Telemetry	Maximum Input Level (pass/fail)		
		Pass	Pass	Pass
		Pass	Pass	Pass
		Pass	Pass	Pass
		Pass	Pass	Pass
		Pass	Pass	Pass
		Pass	Pass	Pass
		Pass	Pass	Pass

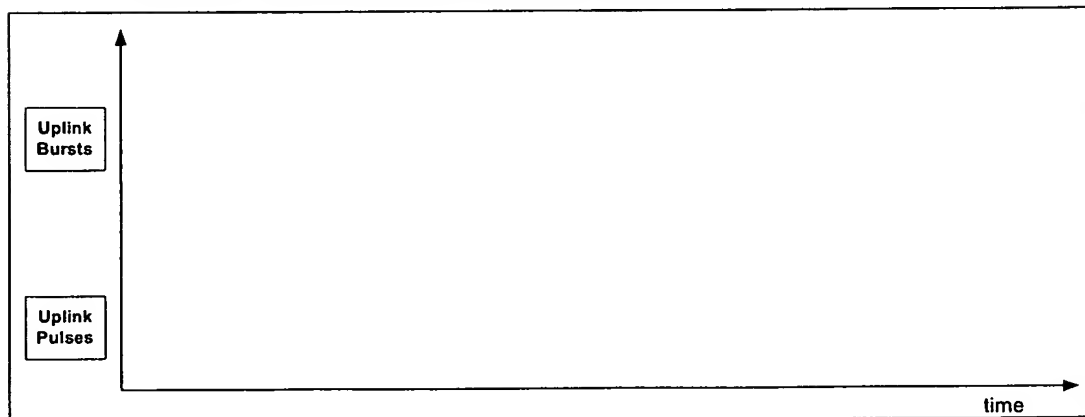
### 4.5.2 Detection Margin Test

#### 4.5.2.1 Objective

To verify uplink detection margin meets the requirements specified in the *Receive Telemetry (Uplink)* section of the PEM Electrical Specification.

#### 4.5.2.2 Method and Equipment

**Figure 2: Example Uplink Detection Margin Test Waveforms**




#### 4.5.2.3 Test Cases

There are      test cases using all combinations of test values below:



# EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	Sht 33 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

Parameter	Test Values	Units

## 4.5.2.4 Acceptance Criteria

Telemetry Type	Data Bursts	Amplitude A1	Antenna	Detection Margin (Uplink dB)	
				Min	Max

## 4.5.2.5 Test Setup

- 1.
- 2.
- 3.
- 4.
- 5.


## 4.5.2.6 Test Procedure

- 1.
- 2.
- 3.
- 4.

## 4.5.2.7 RESULTS **PASS**

All devices met the acceptance criteria.

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> <b>288117-70205</b>	<b>Rev/Version</b> <b>1.0</b>	<b>Sht</b> <b>34 of 49</b>
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

[illegible]


### 4.5.3 Noise Immunity Test

#### 4.5.3.1 Objective

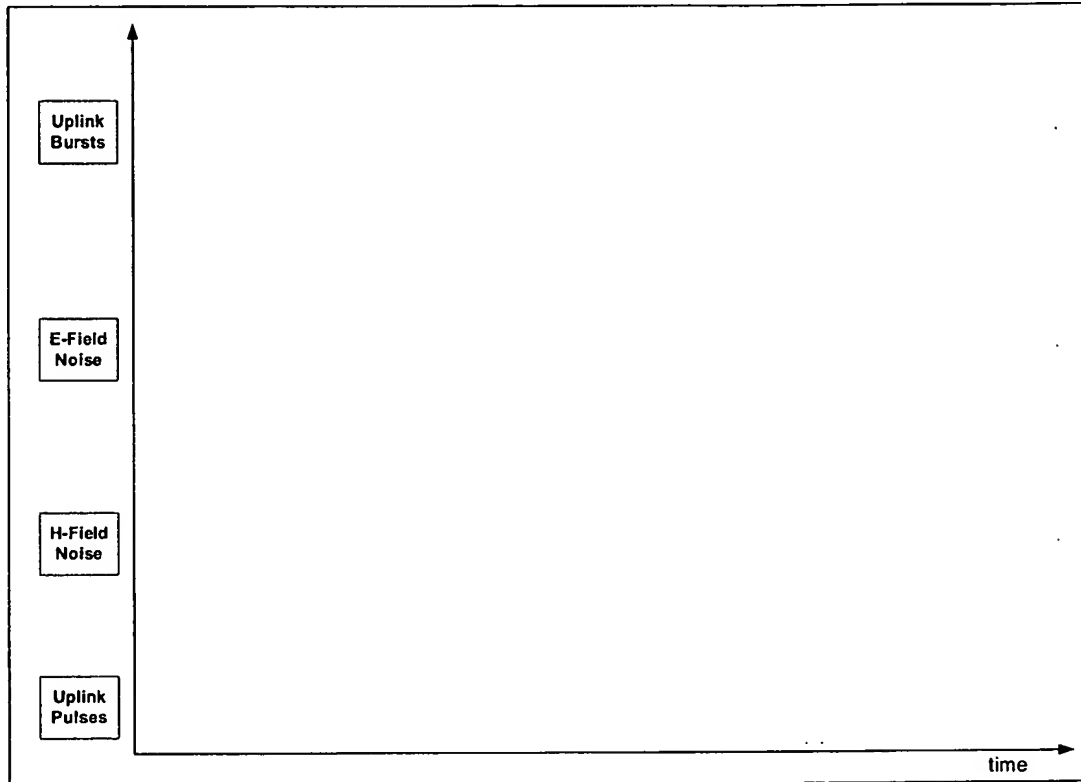
To verify uplink noise immunity meets the requirements specified in the *Receive Telemetry (Uplink)* section of the PEM Electrical Specification.

#### 4.5.3.2 Method and Equipment

# EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 35 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

**Figure 3: Example Uplink Noise Immunity Test Waveforms**




## 4.5.3.3 Test Cases

There are        test cases using all combinations of test values below:

Parameter	Test Values	Units

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 36 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

### 4.5.3.4 Acceptance Criteria

Telemetry Type	Uplink Level A1 (dB)	Antenna	Min E-Noise Immunity (dB)	Min H-Noise Immunity (dB)

### 4.5.3.5 Test Setup

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.


### 4.5.3.6 Test Procedure

- 1.
- 2.
- 3.
- 4.
- 5.

### 4.5.3.7 RESULTS **PASS**

All devices met the acceptance criteria.

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> <b>288117-70205</b>	<b>Rev/Version</b> <b>1.0</b>	<b>Sht</b> <b>37 of 49</b>
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

[illegible]


#### 4.5.4 Signal Distortion Test

#### 4.5.4.1 Objective

To verify uplink signal distortion meets the requirements specified in the *Receive Telemetry (Uplink)* section of the PEM Electrical Specification.

#### 4.5.4.2 Method and Equipment

## EXHIBIT B (cont.)

 <b>Medtronic</b>	Neurological	Document Number 288117-70205	Rev/Version 1.0	Sht 38 of 49
Title: Neuro Patient Programmer Platform Electrical DVT Report				

### 4.5.4.3 Test Cases

Parameter	Test Values	Units

There are test cases for Tel A, and test cases for Tel N.

### 4.5.4.4 Acceptance Criteria

Telemetry Type	Uplink Level A1 (dB)	Antenna	Interval Distortion (μS)	Active/Idle Distortion (μS)

### 4.5.4.5 Test Setup

- 1.
- 2.
- 3.
- 4.

5.


### 4.5.4.6 Test Procedure

- 1.
- 2.
- 3.
- 4.

### 4.5.4.7 RESULTS **PASS**


All devices met the acceptance criteria.

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> <b>288117-70205</b>	<b>Rev/Version</b> <b>1.0</b>	<b>Sht</b> <b>39 of 49</b>
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

[illegible][illegible]

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> <b>288117-70205</b>	<b>Rev/Version</b> <b>1.0</b>	<b>Sht</b> <b>40 of 49</b>
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

[illegible]

#### 4.5.5 Turnaround Time Test

#### 4.5.5.1 Objective

To verify uplink turnaround time meets the requirements specified in the *Receive Telemetry (Uplink)* section of the PEM Electrical Specification.

#### 4.5.5.2 Method and Equipment


#### 4.5.5.3 Test Cases

There are test cases using all combinations of test values below:

Parameter	Test Values	Units



## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 41 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

### 4.5.5.4 Acceptance Criteria

Supply Voltage	H-Bridge Drive Duty Cycle	Turnaround Time (mS )

### 4.5.5.5 Test Setup

- 1.
- 2.
- 3.

### 4.5.5.6 Test Procedure

- 1.
- 2.
- 3.
- 4.

### 4.5.5.7 RESULTS **PASS**

All devices met the acceptance criteria.

	Turnaround Time (pass/fail)
Test	


### 4.5.6 Hold Drift Test

#### 4.5.6.1 Objective

To verify the hold drift meets the requirements specified in the *Receive Telemetry (Uplink)* section of the PEM Electrical Specification.

#### 4.5.6.2 Method and Equipment

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 42 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

### 4.5.6.3 Test Cases

There is test case:

Parameter	Uplink Level	Units

### 4.5.6.4 Acceptance Criteria

Time after hold circuit enabled	Max Hold Drift


### 4.5.6.5 Test Setup

- 1.
- 2.
- 3.

### 4.5.6.6 Test Procedure

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

# EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> <b>288117-70205</b>	<b>Rev/Version</b> <b>1.0</b>	<b>Sht</b> <b>43 of 49</b>
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

## 4.5.6.7 RESULTS **PASS**

All devices met the acceptance criteria.

Hold Drift (mV)
<div></div>

## 4.5.7 New-Battery FET Test

### 4.5.7.1 Objective

To verify that enabling the new-battery FET circuit reduces the receiver noise floor (ambient RF energy detected by the receiver circuit) when new batteries are used.

### 4.5.7.2 Method and Equipment

### 4.5.7.3 Test Cases

There is test case:

Parameter	Uplink Level	Units


### 4.5.7.4 Acceptance Criteria

Supply Voltage	New-Battery FET	RSSI Peak

### 4.5.7.5 Test Setup

- 1.
- 2.
- 3.

# EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	Sht 44 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

## 4.5.7.6 Test Procedure

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

## 4.5.7.7 RESULTS **PASS**

All devices met the acceptance criteria.

New-Battery FET (mV)													
Min	Max	Mean	Std dev	Min	Max	Mean	Std dev	Min	Max	Mean	Std dev	Min	Max

## 4.6 Telemetry Performance Tests


### 4.6.1 Telemetry Map Area at a Fixed Distance Test

#### 4.6.1.1 Objective

To verify telemetry performance in terms of map area at a fixed distance meets the requirements specified in the *Telemetry Performance* section of the PEM Electrical Specification.

#### 4.6.1.2 Method and Equipment

## EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 45 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

4.6.1.3 Test Cases

Parameter	Test Values	Units

There are    test cases.

4.6.1.4 Acceptance Criteria

IPG	Antenna	Map Area @ 5cm

4.6.1.5 Test Setup


- 1.
- 2.

4.6.1.6 Test Procedure

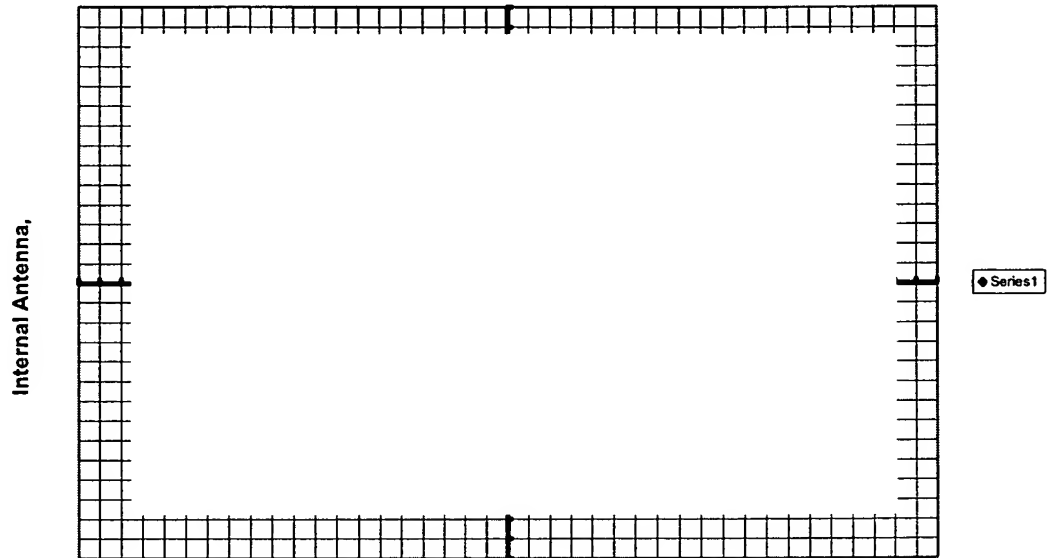
- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

4.6.1.7 RESULTS **PASS**

EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 46 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

4.6.1.7.1 Internal Antenna Map @



4.6.1.7.2 Internal Antenna @

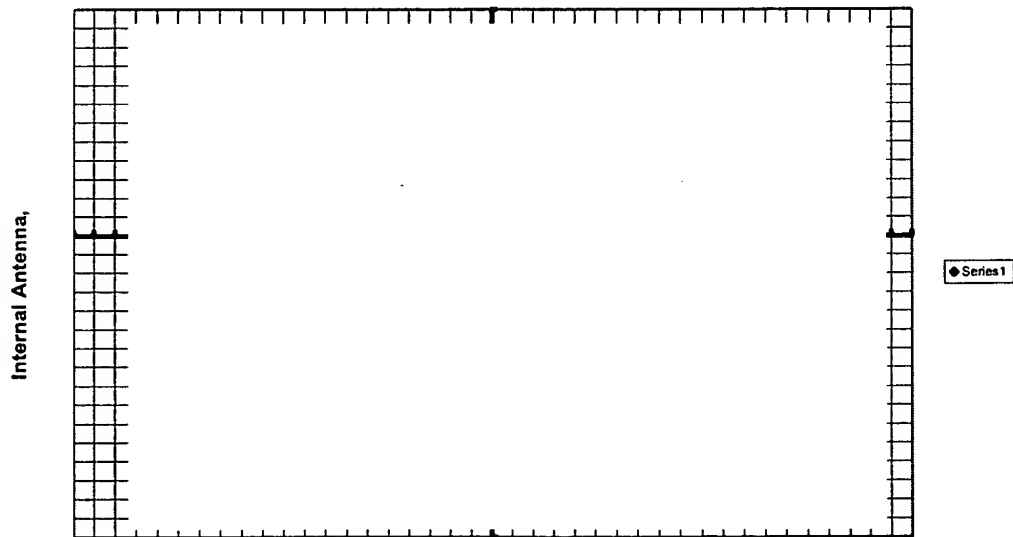

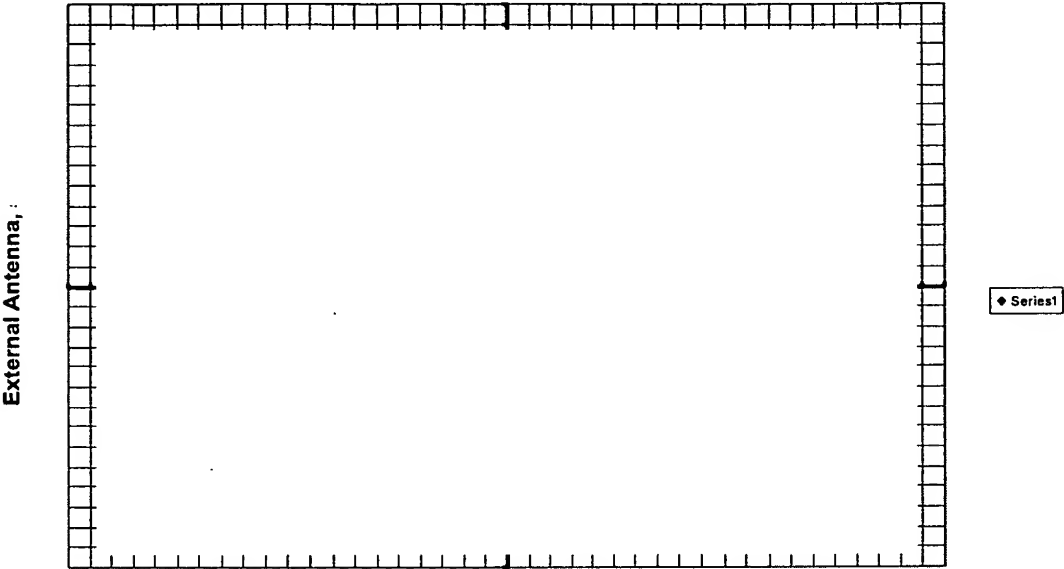


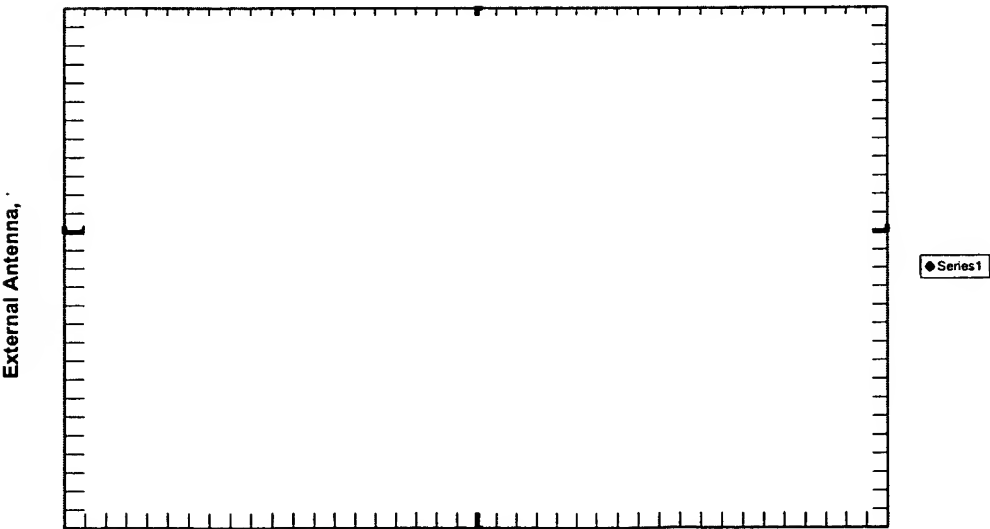
EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 47 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

4.6.1.7.3 External Antenna Map @




4.6.1.7.4 External Antenna @

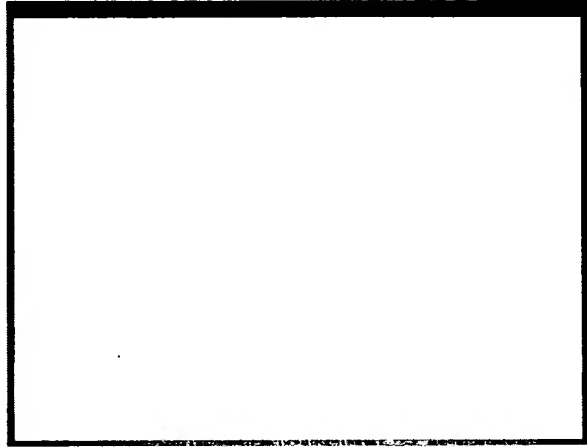


4.6.1.7.5 Photo of test fixture showing

EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 48 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

in this photo.



4.6.1.7.6 Photo of

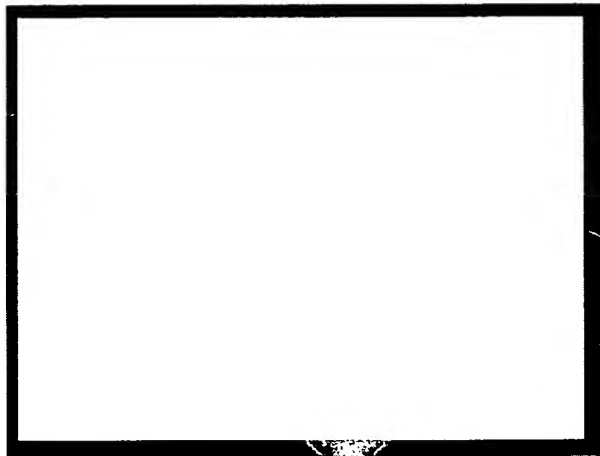





EXHIBIT B (cont.)

 <b>Medtronic</b>	<i>Neurological</i>	<b>Document Number</b> 288117-70205	<b>Rev/Version</b> 1.0	<b>Sht</b> 49 of 49
<b>Title: Neuro Patient Programmer Platform Electrical DVT Report</b>				

**5 COMPLETION**

This paragraph concludes this test specification.

**This Page is Inserted by IFW Indexing and Scanning  
Operations and is not part of the Official Record**

**BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☒ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: \_\_\_\_\_

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.**